Methodology in the study of teaching

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Methodology in the Study of Teaching

by Welko Tomic

S ince time immemorial we have been trying to solve all sorts of problems. In the beginning these problems were concrete ones, which, if adequately solved, increased our chances of survival. Today, even practical problems are so complex that to solve them calls for a highly developed methodology and an advanced set of instruments.

The empirical researcher has taken on the task of finding out how systems fit together and how they work. He or she is comparable to a child who takes apart a clock to see how all the parts are constructed and situated in order to deduce how they connect to one another. This analytically oriented research indicates a certain relationship to knowledge. In other words, the investigator who finds out how a system is put together and how it works and who then reports his or her results to others, is contributing to the present knowledge base.

In the example above no mention was made of an explicit theory serving as the researcher's point of departure. According to some researchers, however, a study should be based on certain ideas about the structure and operation of the system under investigation. In such a study a test is carried out and it will either reinforce or weaken a theory.

Our concept of paradigm agrees with Gage (1985) who describes it as an intrinsically integrated cluster of substantive concepts, variables, and problems which can be attacked with corresponding methodological approaches and tools.

Problems calling for solutions are of various types (Plomp, 1990; Gephart, 1972), those in the field of research into educational psychology being no exception. In the first place, we can identify problems resulting from the need to 'know.' The solution to such problems can be obtained through research directed at acquiring knowledge and gaining insights. In our example, this means trying to understand phenomena related to education.

In the second place, we can identify problems resulting from the need to 'develop' or 'make' something. For example, this may be the case when we develop a training program to change the behavior of teachers. The solution is obtained by designing something.

In the third place, we can identify problems resulting from the need to 'choose.' The solution here lies in evaluating the opportunities at hand. The focus is on facilitating and support-ing choices and decisions. For example, this may be the case when we train students for the teaching profession.

In the study of teaching, we can observe different research programs. By the concept 'research programs' we mean the variety of inquiry methods found in the study of teaching. The term 'research program' can be used interchangeably with the concept paradigm. Our concept of paradigm agrees with Gage

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The major research programs in the study of teaching are: process-product research, academic learning time research, teacher cognition research, research on student cognition and mediating mechanisms of teaching, and classroom ecology research (Shulman, 1986). The last two types of research are also called research from a sociolinguistic perspective (Evertson & Smylie, 1987).

In this article, we will concentrate on the first type of problem, in which the researcher attempts to expand our knowledge, in this particular case in the field of research into teaching. We will first touch briefly on the meaning of quantitative and qualitative research methods for the study of teaching. Second, we will sketch the above mentioned research programs. Finally, we will try to assess the adequacy of qualitative research methods in the study of teaching on the basis of the kinds of phenomena and results such work has revealed.

Quantitative Research Approach

Since we assume that social scientists are familiar with the quantitative research approach, we will give only a brief outline of this approach.

Until the seventies, most research on teaching used the methods of behavioral scientists. The scientific method goes back to the time of Galileo (1546-1642) and includes a refined form of systematic experimentation. That standard enabled scientists to make use of findings by other scholars and laboratories, even those made in other disciplines. The stan-

dard was based on observation, reasoning, experiment and replicability (Rosenberg & Birdzell, 1990).

The methods used in the study of teaching in the quantitative research approach usually include techniques of observation, testing, and statistical analysis.

Traditional quantitative research obviously also contains qualitative aspects. We may observe that the results of such research is always translated into words. This is also true for the analysis of the data. Statistical techniques are in and of themselves insufficient. Numerical data must be interpreted. A good example is when we define the factors to be used in factor analysis.

The quantitative research approach, however, is positivist, law-seeking.

Qualitative Research Approach

Especially after the cognitive shift in educational psychology, the quantitative research approach has been challenged: anthropologists, linguists and sociologists have proposed qualitative methods. In their view, these methods challenge the presuppositions of the natural science approach to scientific investigation (Rist, 1977). We must also be aware that the grand theories developed by Freud, Piaget, and Vygotsky had their empirical basis in qualitative research.

The qualitative research approach tries to interpret the world from the point of view of the subjects or persons being studied.

In qualitative research in the strict sense, the investigator makes exclusive use of qualitative techniques to gather and process data. Applications of the qualitative method can be found in the social sciences, such as anthropology, political science, sociology and to a lesser extent psychology. Applications in the natural sciences, such as physics, astronomy, chemistry, etc., are unknown. [In the field of agricultural research, we found an example of a study in which the investigator uses a qualitative evaluation method, aiming at assessing the crop yield potential. The conclusion is that the fully qualitative evaluation procedure has shortcomings (Van Lanen, 1991).]

The first step in the development of the qualitative method is generally acknowledged to be the work of the anthropologist Malinowski (1926).

Two schools in the field of psychology rely exclusively on qualitative research: symbolic interactionism and existential phenomenology. Goffman (1963), who employed participant observation to collect data concerning situations in public life, is an exponent of the first school. There is some agreement that a like manner of conducting research facilitates the development of theories, but is not suitable for testing hypotheses.

The existential-phenomenological school in psychology is represented by Giorgi, who believes that research must focus primarily on the structure of human experience and the meanings individuals confer, and not on causal relations (Giorgi, 1978). This school has, for example, conducted qualitative research into learning (Giorgi, 1978).

In both schools, descriptions and the meanings bestowed by individuals play a dominant role. This is also called interpretive inquiry (Anderson & Burns, 1978).

We will describe a number of the ideas that proponents of the qualitative research approach subscribe to.

First, qualitatively oriented researchers mainly take an inner perspective on human behavior (Rist, 1978). The aim of the qualitative method is not so much nomothetic as ideographic. The attempt is to acquire knowledge and insight into the uniqueness of a group, whatever that may be. That means that the qualitative research approach tries to interpret the world from the point of view of the subjects or persons being studied.

Second, we can only do justice to the inner perspective by trying to participate, for instance in the classroom life of the teacher, and by seeking insight through introspection. American researchers were particularly dissatisfied with the results obtained in the period 1875-1920 by European psychologists in their studies into the phenomena of consciousness. In general these studies made use of the introspection method. European researchers reported what was going on in the brain by means of introspection. This method has been abandoned, however, because it eventually proved unusable (Linschoten, 1964). It is inadequate for both subject and researcher, because many of the aspects of affective and cognitive processes remain inaccessible. Attempts to solve the problems inherent to introspection have involved making metaphorical comparisons between human cognition and various technological accomplishments that our culture has produced, such as the clock, the steam engine, the radio, radar, and the computer (Vroon, 1986).

A quantitative researcher reports figures, either in tables or in graphs, but these figures are always accompanied by some reflections.

Third, researchers who support the qualitative approach believe that the advantage lies in its being directly applicable in real-life situations, because the results are borrowed from those situations (Van Zuuren, 1987). They also believe that the subject can be observed in more natural surroundings, which is undoubtedly true. One might say that advocates of the qualitative research approach give priority to ecological validity. The assumption that the results are easily applied to other situations is in our opinion a misconception. Although qualitative research may score high in ecological validity, something we also observe in the new approach to the study

of memory, for example, the question is whether the results can be generalized easily to a large degree (Banaji & Crowder, 1989).

In our opinion it is a misconception that in order to gain knowledge useful in everyday situations, research must take place in such situations (Linschoten, 1964). Take for example a person who crashes into a tree while driving because he did not see it. The ophthalmologist who treats him does not have to place a series of trees in his office; he can examine this person using more objective methods. In any case, it is not necessary to use everyday situations for the benefit of research.

Qualitative research is generally characterized as a systematic form of empirical research whose aim is to describe a phenomenon, making use of the researcher's own reflections.

Fourth, qualitative research is generally characterized as a systematic form of empirical research whose aim is to describe a phenomenon, making use of the researcher's own reflections. The goal is not so much to uncover causal relationships, but rather to uncover the structure and understand meaningful associations by working out the essence in abstract terms.

Fifth, the results of research in the qualitative method are generally not expressed in numbers. The proponents of this method believe that qualitative research digs deeper than quantitative research. This, too, is a misconception. A quantitative researcher reports figures, either in tables or in graphs, but these figures are always accompanied by some reflections. When numerical data is being interpreted, the numbers do indeed play an important role, but often data from other sources is added as well (Kruijer, 1986).

Sixth, the qualitative approach yields extensive and careful descriptions of what goes on in classrooms. The descriptions are rich in details and interpretation. The qualitative researcher is preoccupied with understanding reality and is not willing to break down reality into its component parts. So the approach is anti-reductionistic.

Seventh, researchers often link their preference for qualitative methods to two aspects of the experimental situation or object (Campbell, 1975; Yin, 1984). In the first place their opinion is that the phenomenon under study is difficult to isolate from its environment. The context apparently has a great impact on the manifestation of this phenomenon. Nevertheless, the quantitative method can also do justice to the phenomenon under investigation in its specific context. In the second place, they believe that qualitative methods are adequate when there is a small number of units to be studied.

The qualitative researcher wants to collect first-hand information. The methods used for this purpose are participant observation, in-depth interviewing, full participation in the processes being investigated, field work and the like (Rist, 1977).

An important characteristic of a qualitative research method is that participation in the situation being studied is relatively long term, so that the investigator can achieve a fairly detailed description of actual behavior and, at times, the background to this behavior in the social system involved.

An important characteristic of a qualitative research method is that participation in the situation being studied is relatively long term, so that the investigator can achieve a fairly detailed description of actual behavior and, at times, the background to this behavior in the social system involved. The concern here is to conduct a fairly intensive study into the phenomenon in its natural situation or natural context, so that the interplay between relevant factors remains intact. Participant observation in its original sense implies that the researcher lives in a group for a longer period of time and takes part in the activities of that group. According to Kobben (1991), this method was born of necessity, because anthropologists often worked among illiterate people. A research method such as a questionnaire would not have been possible.

Despite the fact that the qualitative method is much older than the quantitative method, it is obviously less elaborated. The literature concerning the qualitative method generally restricts itself to more abstract, vague methodological indications or to a description of and reflections about experiences in a concrete study. Scarcely any systematic study or description exists that defines rules for the investigator.

We must also observe that, in contrast to the quantitative method, there is as yet no description of the historical development of the qualitative method (Van Buuren, 1990). This is particularly remarkable when we consider how old the qualitative method is. The first ethnographic descriptions date from the fifth century B.C.; these were observations made by travelers, religious missionaries and merchants (Douglas, 1976; Wax, 1971). Descriptions by civil servants and government military personnel are also known.

The qualitative research approach is interpretive, personal meaning oriented.

Research Programs

An important example of the quantitative approach tradition is process-product research, in which one tries to discover causal relations between teaching practices and student learning outcomes. This research program is in line with the research tradition of behavioristic psychology. It was the most

productive of the programs of research on teaching in the seventies and early eighties. Process-product research on teaching yielded results demonstrating that teachers really do make a difference. In other words, variations in teacher practices are systematically related to variations in student learning outcomes, in the cognitive as well as in the affective domain. Results of research in this program are reviewed by Brophy and Good (1986).

Another research program in the study of teaching is called academic learning time research. Here investigators relate teaching practices to student actions, as inferred from the time allocations made by students.

A third research program is the student mediation program. Here investigators focus on student thoughts and feelings and relate them to teacher actions and subsequent student actions or capacities (Shulman, 1986). This program appears to be a bridge between the quantitative and the predominantly qualitative research approach.

A fourth program is teacher cognition research, in which investigators focus on the relationship of teacher thought to teacher action. This research program is qualitatively oriented. Investigators realize that they must cope with less immediately observable aspects of teaching. This program is associated with notions of teacher thought, judgment or decision making. This research program has produced very few remarkable results.

A fifth research program is classroom ecology. The aim of investigation is the reflexive influences of teacher and student actions. This is an example of a predominantly qualitative research approach. The researchers come from disciplines like anthropology, sociology, and linguistics. The purpose of classroom ecology research is interpretation. One is in search of meaning (Geertz, 1973). This program has not yet yielded aggregation and accumulation of usable knowledge. The yield of research is still questionable. However, and this is important, the yield is considerable concerning new questions.

Research programs in which investigators are qualitatively oriented focus on aspects like classroom discourse, peer talk, talk used by teachers in academic instruction and to control classroom events.

Assessment of the Qualitative Research Approach

The aim of qualitative research, moreover, is very general and rather vague. The theoretical notions are built on inadequate foundations, and it is not clear how one must enter that part of reality being studied. Generally the less reliable and less structured research methods are used, such as participant observation and open interviews. Problems concerning the validity and reliability of qualitative research have not yet been solved. The internal and external validity tend to be low in general. Another disadvantage of the qualitative approach is that it is either not verifiable, or only verifiable to a limited extent. As a result, subjective elements can creep in. Research methods are often poorly or incompletely documented. Conse-

quently for fellow researchers replication is virtually impossible, a mortal sin in science. Often a detailed description of how data were collected is missing. The same holds for example for information on the frequency of particular observations or interviews. This research is interpretive in nature. It seems to be difficult to conduct such research and to match one's ambition with one's accomplishments. Generalization from a particular case to other cases is often impossible, because the findings are context specific. As a rule, data are too limited to allow generalization. Not infrequently we must guess which steps in reasoning were used to infer from data to conclusions. In the words of Shulman (1986), the long and the short of it is that we must trust the integrity and wisdom of the researcher. This type of research remains vulnerable on many points. Researchers who base their work on the same starting data will not come to the same conclusions.

The choice between qualitative or quantitative method should depend on the nature of the problem, on whether an appropriate theory is available, and on the possibility of structuring and standardizing the measuring instruments.

It is not our opinion that it is wise to replace quantitative research with qualitative. The point is that each kind of investigator should benefit from what the other reports. The choice between qualitative or quantitative method should depend on the nature of the problem, on whether an appropriate theory is available, and on the possibility of structuring and standardizing the measuring instruments. The choice should not depend on whether the researcher has been trained in, or is familiar with, either the qualitative or the quantitative method.

Quantitative researchers can use the insights achieved through ethnography and linguistic analysis, through intensive study of the hidden and subjective meanings of a single phenomenon, to formulate and observe phenomena and variables that they might otherwise ignore. What they should realize is that a single occurrence of a phenomenon, observed by an ethnography or linguist, is only sufficient to prove that the phenomenon in question is possible. But, an important point mentioned by Gage (1985) is that qualitative investigators should realize that their data, as such, are inadequate to determine to which extent the phenomenon is probable. It is well known that the issue of probability can be determined only by the analysis of frequencies in a sample of observations. Such analysis requires samples, unambiguous measures obtained by objective methods, counting, and statistics. A stronger basis in inductive inference for drawing conclusions about cause-and-effect relationships can be obtained only through the study of a number of events or phenomena.

Departing from the above requirements such a study becomes quantitative.

An important point is that the qualitative approach operates in the context of discovery and the quantitative approach in the context of justification.

An important point is that the qualitative approach operates in the context of discovery and the quantitative approach in the context of justification. Therefore, the qualitative researcher can discover new phenomena and relationships or create new hypotheses. The quantitative researcher has better equipment to test, validate, or justify the hypotheses.

Concluding Remarks

Looking at the field of educational psychology, one can observe that there is a variety of research programs applying quantitative as well as qualitative research approaches.

Despite the predominant quantitative research tradition in educational psychology, it is important to remain open to research alternatives. The challenge is to solve the methodological shortcomings of the qualitative research approach, otherwise the question remains whether this approach will indeed prove to be one of those alternatives.

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